Validator Provided

Certified Validation Report

Audit Information:

Water Supplier Name: City of Chino Hills PWS ID: 3610036

System Type: Potable Audit Period: Fiscal Year 2018-2019

Utility Representation: Cheryl Yeamans, Jacob Loukeh

Validation Date: 9/19/19 Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 76 Data Validity Band (Level): Level IV (71-90)

ILI: 0.02 Real Loss: 0.41 (gal/conn/day) Apparent Loss: 2 (gal/conn/day)

Non-revenue water as percent of cost of operating system: 0.8%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

If not, rejected recommendations are included here.

Validator Information:

Water Audit Validator: Mark Wiley Qualifications: Certified AWWA Water Loss Validator

Certified Validation Report

Utility Provided

Water Supplier Name: City of Chino Hills **Water Supplier ID Number:** 3610036 **Water Audit Period:** Fiscal Year 2017-2018

Water Audit & Water Loss Improvement Steps:

Utility to provide steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

The City created a GIS position and hired an employee to address inaccuracies and update mapping and technical pipeline data in 2017. City staff identified a leaking potable storage reservoir and had it repaired in this audit period, two more tanks are scheduled for rehabilitation in the next audit period. Over-age meter replacement is continuing on a 15 year cycle for all size potable meters, with approximately 1,400 meters exchanged during the audit period. Water meters have been installed on all vehicles that use City system water (water trucks, vactors, etc.). The City hired a contractor to replace corroding saddles in this audit and in next year's audit. For the second audit in a row, City owned wells were taken off-line due to the new MCL for TCP. The City is now 100% reliant on purchased water from the State, and two neighboring water agencies.

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audit and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Executive Name (Print)	Executive Position	Signature	Date
Daniel Bobadilla, P.E.	Director of Public Works and Engineering		9/19/19

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Validity Grade
1	Volume from Own Sources	VOS	N/A	Supply meter profile: Wells Inactivated VOS input derived from: Manual reads from production meters as archived. Comments: No meter test documentation, due to wells off-line. Recycled Water not included confirmed.	Percent of own supply metered: 100% Signal calibration frequency: N/A Volumetric testing frequency: Annual, N/A Volumetric testing method: N/A Percent of own supply tested and/or calibrated: N/A Comments: Wells off-line due to contamination, did not have tested during audit period.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	N/A	Input derivation: N/A Net Storage change included in MMSEA input: No Comments: No additional comments	Supply meter read frequency: N/A Supply meter read method: Manual and automatic logging. Frequency of data review for trends & anomalies: Monthly Storage levels monitored in real-time: Yes Comments: No additional comments
3	Water Imported	WI	9	Import meter profile: Water is imported from three agencies: WFA, CDA and MVWD. MVWD and WFA flows through two common meters maintained by MVWD. WI input derived from: Totalization of volumes per daily meter reads from importer and exporter. Comments: Volumetric and calibration data supplied.	Percent of import supply metered: 100% Signal calibration frequency: Annually for CDA Volumetric testing frequency: Annually for CDA Volumetric testing method: Pitot Percent of import supply testes and/or calibrated: 100% Comments: No additional comments.
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	9	Input derivation: 9 Comments: No additional comments.	Imported meter read frequency: Daily Imported meter read method: Manual and automatic data logging. Frequency of data review for trends and anomalies: Monthly Comments: No additional comments
5	Water Exported	WE	N/A		
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	N/A		

7	Billed Metered	BMAC	7	Customer meter profile: Master Meter Manufacturer Age profile: Meters range in age up to 15 years Reading System: AMR Read frequency: Monthly Comments: Lag- time correction is not determined in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of customers metered: 100% Small meter testing policy: Reactive – complaint based or flagged consumption testing only. Number of small meters tested/year: Not quantified but known to be small. Large meter testing policy: Reactive – complaint based or flagged consumption testing only. Number of large meters tested/year: Not quantified but known to be small. Meter replacement policy: Customer meters are replaced every 15 years. Number of replacements/year: Entire meter stock was replaced in 2004-05, replacement is cycling back. Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle. Comments: No additional comments
8	Billed Unmetered	BUAC	N/A		
9	Unbilled Metered	UMAC	9	Profile: Includes street sweepers, vactor and water trucks, flushing. Input derivation: Direct from monthly meter reads. Comments: Input derivation from supporting documents confirmed.	Policy for billing exemptions: Own facilities plus other exemptions including street sweepers, vactors and water trucks. Comments: No additional comments.
10	Unbilled Unmetered	UUAC	3	Profile: Includes Fire Department usage. Comments: Custom California default of .25% used.	Comments: Default grade applied.
11	Unauthorized Consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer Metering Inaccuracies	CMI	3	Input derivation: Rudimentary estimate Comments: See BMAC regarding meter testing & replacement activities.	Characterization of meter testing: Limited (upon request and consumption flag only). Characterization of meter replacement: Customer meters are replaced every 15 years. Comments: No additional comments.
13	Systematic Data Handling Errors	SDHA	5	Comments: Default input applied.	Comments: Default grade applied.
14	Length of Mains	LM	3	Input derivation: Total from GIS based Map. Hydrant leads included: Not Included. Comments: No additional Comments.	Mapping format: Digital Asset management database: In place but separate from GIS. Map updates & field validation: Field validation regularly takes place.

					Comments: The City hired a dedicated GIS staff person to address deficiencies this audit period.
15	Number of Service Connections	NS	9	Input derivation: Standard report run from billing system. Basis for database query: Account ID, Non- premise based. Comments: Inactive connections are included.	CIS updates & field validation: Accomplished through normal meter reading process. Approximately 100 re-reads occur monthly. Estimated error of total count within: Less than 1% Comments: No additional comments.
16	Average Length of Cust. Service Line	LP	5	Comments: Default input applied.	Comments: Default grade applied.
17	Average Operating Pressure	AOP	3	Number of zones, general profile: Operate four pressure zones with 53 PRV's Typical pressure range: 45 -160 PSI Input derivation: Rudimentary Estimate Comments: No additional comments.	Extent of static pressure data collection: Hydrant flow test and pressures are collected at the request of residents and Fire Department personnel. Characterization of real-time pressure data collection: Real-time monitoring limited to reservoir levels. Hydraulic model: None currently in place. Comments: No additional comments.
18	Total Annual Operating Cost	TAOC	9	Input derivation: From official financial reports Comments: Confirmed costs limited to water only, water service and CIP included.	Frequency of internal auditing: Annually Frequency of third-party CPA auditing: Annually Comments: No additional comments.
19	Customer Retail Unit Cost	CRUC	9	Input derivation: All rate classes included. Comments: Customers are billed on a modified water budget rate structure.	Characterization of calculation: This number was derived by dividing the total volume-based revenues by the total volume of potable water delivered in CCF Comments: No additional comments.
20	Variable Production Cost	VPC	7	Supply profile: Own sources and import supply. Primary costs included: Imported & treatment costs. Secondary costs included: Power Comments: No additional comments.	Characterization of calculation: Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.

Key Audit Metrics

(~) VALIDITY Data Validity Score: 76 Data Validity Band (Level): Level IV (71-90)

(#) VOLUME ILI: 0.02 Real Loss: 0.41 (gal/conn/day) Apparent Loss: 2 (gal/conn/day)

($) VALUE Annual Cost of Real Losses: $11,592 Annual Cost of Apparent Losses: $56,183

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Average infrastructure age generally falls around 30 years, and a small amount of infrastructure is 50+ years in age.
Infrastructure replacement policy (current, historic): Due to corrosive soils, infrastructure is replaced with PVC, any buried metallic appurtenances are wrapped in plastic.
Estimated main failures/year: 19 Estimated service failures/year: 41
Extent of proactive leakage management: The City is proactively replacing mild steel saddles with bronze saddles in problematic areas. A leaking potable reservoir was identified and repaired. Two more have been identified for rehabilitation.
Other water loss management comments: Soils are highly corrosive and severely impact infrastructure.

Comments on Audit Metrics & Validity Improvements

The infrastructure Leakage Index (ILI) of .02 describes a system that experiences leakage at .02 times the modeled technical minimum for its system characteristics. This number is unrealistic and should be higher. The City should consider having the Monte Vista Water District calibrate and test their import meters, it seems apparent that they are under registering.

The Data Validity Score falling within Band IV (71-90) suggests that next steps may be focused simultaneously on improving data reliability and evaluating interventions for water and revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.
- Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.
- Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.
- Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in

manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.

- Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.
- Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).
- Expand meter accuracy testing to a larger group of meters.
- Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.
- Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.
- Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.
- Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.